



FES Discharger 2

User manual, Version 1.23



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1. Important notices

This user manual contains important information about proper and safe usage of FES Discharger 2. If something is not clear and you need more information, please contact the manufacturer LZ design.

Information in this document are subject to change without notice. LZ design reserves the right to change or improve this product and to make changes in the content of this material without obligation to notify any person or organization of such changes or improvements.



Warning: *Means that the non-observation of the corresponding procedure leads to an immediate or important degradation of the safety.*



Caution: *Means that the non-observation of the corresponding procedure leads to a minor or to a more or less long-term degradation of safety.*



Note: *Draws the attention on any special item not directly related to safety by which is important or unusual.*

1.1 Limited Warranty

This product is warranted to be free from defects in materials or workmanship for two years from the date of purchase. Within this period, LZ design will, at its sole option, repair or replace any components that fail in normal use. Such repair or replacement will be made at no charge to the customer for parts and labour, however the customer shall be responsible for any transportation and custom costs.

Usage of device is at user's own risk. LZ design will not under any circumstances accept any responsibility or will be liable for possible damage on people, animals or things, which might directly or indirectly happen from using the FES Discharger 2.

To obtain warranty service, please contact your local dealer or LZ design, directly.

1.2 Invalid Warranty

The warranty does not cover failures due to abuse, misuse, accident, or unauthorised alterations or repairs.

The warranty becomes invalid in the case of discharging other than FES battery packs. The discharger is not waterproof in anyway.

2. Introduction

FES Discharger 2 is a standalone device. It was developed for safe discharging of single FES battery pack to 50% state of charge (SOC), which is most suitable for storage of battery packs during longer time of inactivity, to achieve slow aging of Lithium-ion cells.

Compared to previous "FES discharging assistant", there is no need to connect external DC load (oil radiator) anymore. Additionally, higher discharging power makes total time of discharging shorter.



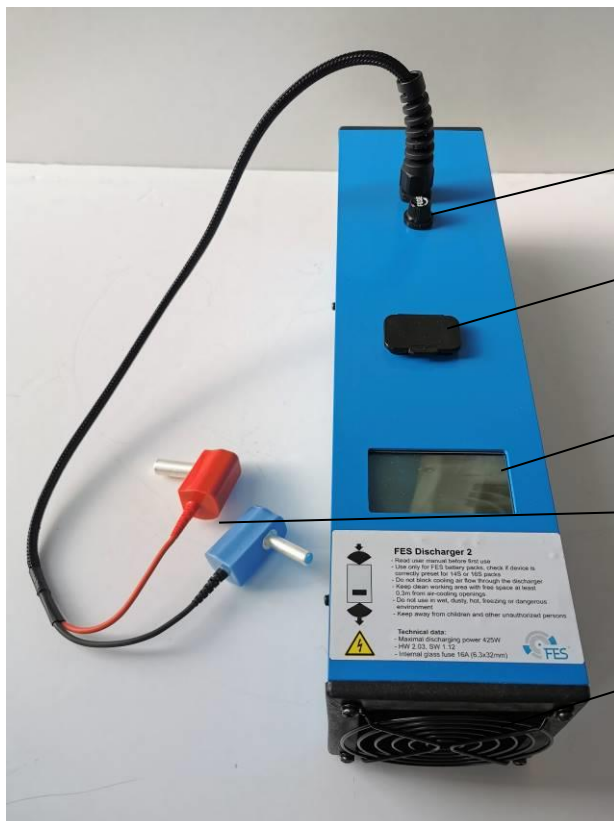
Note: *It is very important to distinguish between 14S (14 cells wired in serial) and 16S (16 cells wired in serial) FES Battery packs, due to different voltage level! FES Discharger 2 should be delivered already properly adjusted for usage with 14S or 16S Battery packs.*



Warning: *When connected to **FES 14S Battery pack** and before starting discharging, "**14S**" indication must be visible on the LCD display (above SOC value).*



Warning: *When connected to **FES 16S Battery pack** and before starting discharging, "**16S**" indication must be visible on the LCD display (above SOC value).*



16A 6.3x32mm standard glass fuse

Software update connector cover

Touch LCD display

+ and - connecting cable

Cooling fan

FES Discharger 2 is protected with 16 A 6.3x32 mm standard fuse. It is in its own housing, so it is accessible without opening the discharger.



16 A 6.3x32 mm Standard fuse

2.1 Technical characteristics



Warning: FES Discharger 2 is suitable for discharging a single FES battery pack.

	FES Discharger 2
End of discharge (50% SOC)	52 V in 14S configuration / 59 V in 16S configuration
Max. discharging power	425 W 14S configuration / 435 W 16S configuration
Max. discharging current	9 A
Length of connecting cables	70 cm
Dimensions	365 x 110 x 110 mm (L x W x H)
Touch LCD display dimensions	65 x 35 mm (L x W)
Weight	2,9 kg

2.2 Touch LCD display

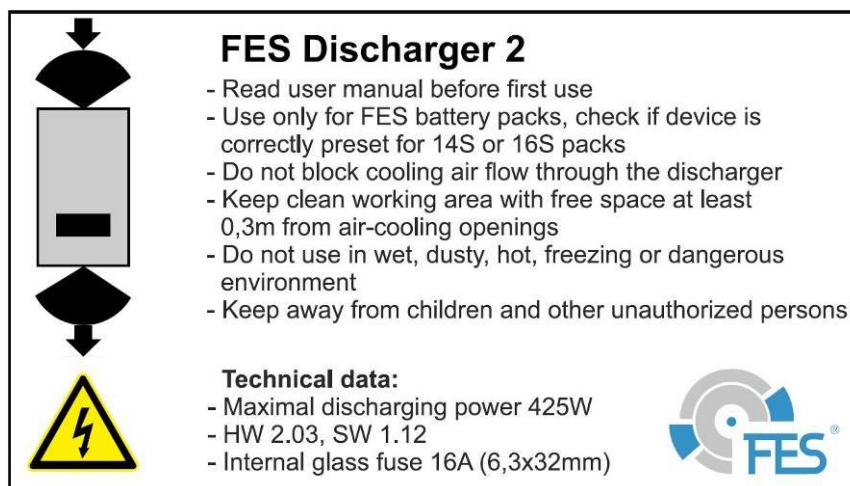
A touch LCD display enables easy operating and controlling (turning it ON and OFF) of the device and shows the basic battery pack data.



The basic menu.

2.3 FES Discharger 2 sticker

Below the LCD display, there is a sticker showing important warnings and basic technical data.



FES Discharger 2 sticker

3. Warnings and safety instructions

The following warnings and safety instructions should be considered when using the device:

- Do not start using a device before reading and understanding user manual.
- Place device on a flat and clean surface, with possibility of air exchange.
- Ensure the distance from the walls or other objects. Leave enough space (at least 30 cm) between the cooling openings and other objects or walls.
- Note that device and exhausted air will become warm during operation.
- Do not cover front or rear side of device in any way to block cooling air flow through the device.
- Do not use in wet, dusty, moist, freezing, hot or dangerous environment.
- Keep away from children and unauthorised persons.
- Do not pull out the fuse or open software connector when the device is connected to battery pack.

4. How to use

Read these operating instructions carefully before using the discharger for the first time.



Note: *It is very important to distinguish between 14S (14 cells wired in serial) and 16S (16 cells wired in serial) FES Battery packs, due to different voltage level! FES Discharger 2 should be delivered already properly adjusted for usage with your specific FES battery packs – 14S or 16S.*



Warning: *When connected to **FES 14S Battery pack** and before starting discharging, "**14S**" indication must be visible on the LCD display (above SOC value).*



Warning: *When connected to **FES 16S Battery pack** and before starting discharging, "**16S**" indication must be visible on the LCD display (above SOC value).*



Caution: In a 1 m radius, remove the dust and all unnecessary things which could prevent airflow through the discharger.



Caution: Only one battery pack can be discharged at one time. Never use connecting cable to discharge both battery packs at the same time!

1. Connect blue minus and red plus plug to the single battery pack.



FES Discharger turns ON and FES logo appears on touch LCD display.



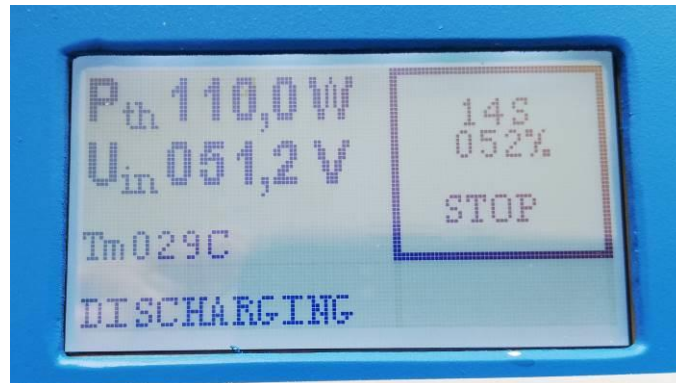
Welcome screen with FES logo

2. After a few seconds the menu with basic parameters shows up.



The basic menu

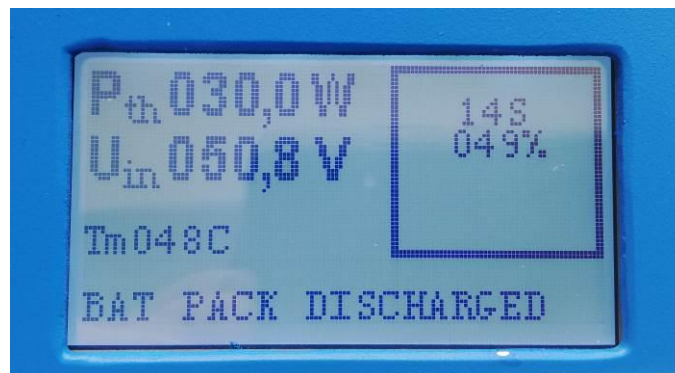
3. To start discharging press START on a touch LCD display. The fans start working (cooling). A text "DISCHARGING" is displayed.



Discharging screen

Power consumption start rising until maximal allowed discharging value.

4. Discharging process is finished at 50% SOC. Buzzer sound becomes active for 10 seconds and a text "BAT PACK DISCHARGED" is displayed.



"Battery pack discharged" screen

The cooling fans stop working when the temperature inside the discharger drops to 40°C or less.

5. **It is very important to disconnect the battery packs when the discharging is over!** After battery packs are discharged to 50% SOC, some drain current remains (Approx. 70 mA), which can discharge the battery packs to 0% SOC if they are left connected for a longer time (more than 24 hours).



Warning: After discharging to 50% SOC, the battery pack should not stay connected to the discharger for a longer time (more than 24 hours). It can cause serious damages of the battery packs!

6. Start discharging the second FES battery pack.

5. Error messages

Error message	Sound	Error description	Error reset
"INPUT VOLTAGE TOO LOW"	0.2 s sound / 1 s pause	Battery voltage is under 49V.	Charge the battery.
"TEMPERATURE TOO HIGH"	1 s sound / 1 s pause	Inside temp. of discharger is above 65°C.	Press STOP button or disconnect the cables.
"CHECK FUSE"	2 s sound / 1 s pause	The fuse is missing or is blown.	Disconnect the cables and replace the fuse.
"FAN ERROR"	3 s sound / 1 s pause	The fan is broken or stuck.	Disconnect the cables and remove the obstacle.

In case of any other fault or damages, please contact LZ design directly.

6. Revision history

August 2019	Initial release, user manual v1.0
December 2019	Updated and more detailed information, user manual v1.1
February 2020	Updated photo, user manual v1.2
February 2020	Minor update, user manual v1.21
April 2020	Minor update, user manual v1.22
April 2020	Minor update, user manual v1.23